DOCUMENT RESUME

ED 282 476 HE 020 216

AUTHOR	Ehrhart, Julie Kuhn; Sandler, Bernice R.
TITLE	Looking for More Than a Few Good Women in Traditionally Male Fields.
INSTITUTION	Association of American Colleges, Washington, D.C. Project on the Status and Education of Women.
PUB DATE	Jan 87
NOTE	25p.
AVAILABLE FROM	Association of American Colleges, Project on the Status and Education of Women, 1818 R Street, NW, Washington, DC 20009 ($5.00, prepaid).
PUB TYPE	Guides - Non-Classroom Use (055) -- Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Adult Students; *Career Choice; Change Strategies; Check Lists; College Environment; College Programs; Disabilities; *Females; Higher Education; *Majors (Students); Minority Groups; *Nontraditional Occupations; Nontraditional Students; *School Holding Power; Self Evaluation (Groups); Student College Relationship; Student Experience; *Student Recruitment

ABSTRACT

Reasons why more women are not studying and completing degrees in tradionally male fields are discussed, along with what can be done by colleges to help remedy the situation. A focus of attention is the academic and social environment experienced by women students in traditionally male college programs. In addition, precollege experiences for women are briefly examined, including socialization away from "male" interests, and encouragement or discouragement by parents, teachers, and counselors. Special concerns of minority women, older women, and disabled women are also addressed. Sources of information include: empirical studies of students at all educational levels; campus reports and surveys; interviews with college personnel and faculty involved in programs to attract and retain women in traditionally male fields; and responses to a "call for information" issued by the Project on the Status and Education of Women. Recommendations for recruiting and retaining women in traditionally male programs are provided, along with an institutional self-evaluation checklist, a bibliography, and a list of resource organizations, including the address, phone number, and contact persons. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED282476

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Julie Kuhn Ehrhart
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PROJECT ON THE STATUS AND EDUCATION OF WOMEN
ASSOCIATION of AMERICAN COLLEGES

LOOKING FOR MORE THAN A FEW GOOD WOMEN IN TRADITIONALLY MALE FIELDS

Julie Kuhn Ehrhart and Bernice R. Sandler

Occupational Segregation

Although many occupational barriers have fallen, the U.S. work force is still almost entirely sex-segregated; most occupations are either predominantly female or predominantly male in composition. Women are clustered primarily in low-status and low-paying clerical, retail sales, and service jobs often termed the "pink-collar ghetto."[1] Women are severely underrepresented at the other end of the occupation spectrum. At least 75 percent of the jobs in the higher-paying professions are held by men.[2] Moreover, while the percentages of women in nontraditional fields have increased, often this has occurred in the lower level jobs within a category. For instance, about 70 percent of white males but only 17 percent of white females work in what the Census Bureau terms "professional and technical" jobs. That 17 percent, however, work primarily in only five of the fifty jobs that comprise professional and technical jobs.

Most women work outside the home and will continue to do so for most of their lives even if they marry or have preschool or school-age children.[3] Yet, whether they are college educated or not, a large number of these women will work in jobs characterized by low salaries and little chance for advancement. While no one would deny the value of the jobs that women traditionally hold or the importance of these jobs to the economy, the channeling of women into a limited number of lower-paying fields has turned many of these occupations into female job ghettos that put a cap on women's earning power, limit women's opportunities to pursue their own talents, and may limit women's chances to contribute to society's goals. By contrast, the highly paid and often prestigious fields of science, engineering, law, computer science and technical fields, medicine, and mathematics are predominantly male fields.

The underutilization of women in traditionally male fields takes its toll in several areas. By failing to encourage women as well as men, the country wastes a substantial portion of its talent and severely limits women's potential contributions. Moreover, the social and personal costs of inequity are considerable.

JULIE KUHN EHRHART *is program associate and* BERNICE R. SANDLER *is director of the Project on the Status and Education of Women of the Association of American Colleges.*

Individual copies of this paper are available for $5.00 (prepaid) from the Project on the Status and Education of Women, Association of American Colleges, 1818 R Street, NW, Washington, DC 20009 (202/387-1300). Bulk rates are available. (A list of all PSEW publications is available free with a self-addressed, stamped envelope.)

Copyright 1987 by the Project on the Status and Education of Women, Association of American Colleges. **January 1987**

Women who wish to enter careers in fields where men predominate are less likely to be encouraged to do so and are less likely to be rewarded for their efforts. Women already in these careers are frequently limited by lack of opportunity for advancement, token status, discriminatory employment practices, and unequal pay. Finally, the importance of these fields in the future cannot be underestimated. Science and technology will increasingly change many aspects of the way we live our lives, and the continued underrepresentation of women in science and technology will mean that crucial decisions in these areas will be made with input from only a few women with technical expertise.[4] Obviously the issue of women's participation in fields such as science, law, medicine, computer science, and engineering has important implications not only for women themselves but for the whole of society and the shape of the future.

CONTENTS

Occupational Segregation 1
The Situation in the Educational Pipeline 2
The Role of Higher Education 2
What This Report Hopes to Do 2
The Pre-college Experience: Critical Filters 3
Women Who Choose Traditionally Male Fields 4
The Quality of the College Campus Environment: A Major Factor in the Retention of Women 5
The Nature of Male-Dominated Fields 5
On Being a Woman in a Traditionally Male Field 6
Special Concerns of Minority Women, Older Women, and Disabled Women 7
Stereotypes 8
Devaluation and Doubt 9
Interaction with Peers: Academic Invisibility and Social Overattention 9
Interaction with Faculty, Administrators, and Staff 10
Conclusion 11
Recommendations 11
Selected List of Resources 17
Notes 20
Institutional Self-evaluation Checklist 23

HE 020 216

The Situation in the Educational Pipeline

The underrepresentation of women working in traditionally male careers is mirrored in (and exacerbated by) their continued low college enrollments in these fields. Women now earn 50 percent of all bachelor's and master's degrees and 33 percent of Ph.D.'s. However, as the chart below shows, their representation in some traditionally male fields is significantly below these figures. While data from the past decade[5] show that more women are obtaining degrees in male-dominated areas, these increases are attributable to increases in the percent of total degrees that go to women, *not* to changes in their field preferences.[6] At the same time, more women are entering traditionally female areas—and these fields are becoming more female-dominated in composition.

The percentage of women earning higher degrees decreases significantly at the master's and doctor's level in all fields but especially in male-dominated areas. For instance, while women earn 41 percent of the B.A.'s in business/management, they earn only 29 percent of the M.A.'s and 17 percent of the Ph.D.'s; women earn 13 percent of engineering B.A.'s and 4.4 percent of the Ph.D.'s; they earn 44 percent of B.A.'s in mathematics and only 17 percent of the Ph.D.'s. Thus, the situation in the educational pipeline is one of attrition at the higher degree levels. The numbers of women entering computer science, architecture, business, biological sciences, physical sciences, mathematics, and engineering are increasing, albeit at a slower rate than for other fields.[7] The data show that these trends must not only continue but improve before women achieve parity with men in these fields.

Percent of Bachelor's, Master's, and Doctoral Degrees Awarded to Women in Selected Fields, 1982–83[1]

Field	*Bachelor's*	*Master's*	*Doctor's*
All Disciplines	50.5	50	33.1
Agricultural Sciences	39.4	29.4	13.9
Business and Management	41.1	28.8	16.8
Computer and Information Sciences	36.3	28.3	12.9
Education	75.8	72.6	50.1
Engineering	13.2	9.2	4.4
Foreign Languages	74.3	65.6	56.9
Allied Health[2]	82.5	72.8	43.4
Health Sciences[3]	84.6	75.6	43.8
Home Economics	94.9	91	68.4
Law	58.4	23.3	23.2
Life Sciences[4]	46	43.5	32.1
Mathematics	43.8	34.5	16.6
Physical Sciences	27.3	21.4	14
Psychology	67.5	61.3	47.8
Social Sciences	44.5	37.7	30.3

[1] National Center for Education Statistics, in Betty M. Vetter and Eleanor L. Babco, eds., *Professional Women and Minorities, A Manpower Data Resource Service*, Washington, DC: Commission on Professionals in Science and Technology, 1986.

[2] Includes dental services, medical technology, occupational and physical therapy, and other.

[3] Includes speech pathology/audiology, health care administration, medical laboratory, nursing, pharmacy, and other.

[4] Includes biology, biochemistry & biophysics, microbiology, zoology, and other.

The Role of Higher Education

Colleges and universities have a central role to play in helping women high school students, undergraduates, and graduate students learn about *all* the courses of study and careers available to them. They are in a unique position to facilitate and encourage women's involvement in mathematics, science, law, and business because they educate future professionals in these fields and serve as gatekeepers to the professions.

Not only should colleges and universities commit time and resources to the enrollment and retention of women in these fields, it is in their best interests to do so. Labor market specialists estimate a decline of 12 to 16 percent in college enrollment over the next ten years, due largely to a decline in the college-age population.[8] Postsecondary institutions can offset this decline in enrollment, in part, by insuring that opportunities for women students in traditionally male programs are in place, as well as encouraging the recruitment of women to these programs. Recruitment efforts should not ignore "nontraditional" students such as older women, minority women, women returning to school, disabled women, and low-income women.

What this Report Hopes to Do

This report will discuss some of the reasons why more women are not studying and completing degrees in traditionally male fields and what can be done by postsecondary institutions to help remedy this situation. Particular attention will be focused on women students' experiences in traditionally male programs at the college and university level, that is, the academic and social "climate" in which they learn, develop, and make decisions about their future lives. Some of the information on the climate for women is based on two previous reports done by the Project on the Status and Education of Women, *The Classroom Climate: A Chilly One for Women?* and *Out of the Classroom: A Chilly Campus Climate for Women?*[9] both of which document the nature and impact of differential treatment of men and women in the classroom and in the wider campus setting. In addition, significant factors shaping nontraditional study and career decisions in women's pre-college experience (such as early socialization away from "male" interests; encouragement or discouragement by parents, teachers, and counselors; the influence of role models; and the effect of social and peer pressure) will be briefly discussed.

Sources of information for this report include empirical studies of students at all educational levels; reports and surveys by individual researchers, campus groups and postsecondary institu-

tions; interviews with campus personnel and faculty involved in programs to attract and retain women in traditionally male fields; and responses to a "call for information" issued in conjunction with this project.

This paper also provides an extensive list of recommendations for recruiting and retaining women in traditionally male programs. These are structured to be useful to a wide range of administrators, faculty, and students and can be adapted to a variety of institutional settings. A self-evaluation checklist and a selected list of resources and organizations are also included.

The Pre-college Experience: Critical Filters

Although this report concentrates mainly on women's experiences at the college and university level and what those institutions can do to increase the enrollment of women in nontraditional fields, it is important to briefly examine factors influencing young women's experiences prior to their enrollment in college. It is critical that faculty and administrators understand the environment—both academic and social—in which girls develop certain interests and in which the pattern for future academic and career decisions is often set. College policies and programs to attract and retain more women in these fields do not work in a vacuum. To be effective, they must build on, and in some cases counteract, the pre-college experiences of women.

What happens to girls in elementary and secondary school and at home can help explain why too many young women entering college are not as well prepared for advanced mathematics and science coursework as their male peers, and why they are not as likely to be interested in traditionally male careers. Some of the factors crucial to the development of nontraditional goals in girls are discussed below.

■ **Socialization.** Early childhood socialization—reinforced not only by parents and teachers, but also by the media—teaches children roles, attitudes, and behaviors thought to be "appropriate" for each sex. In general, boys are encouraged to be active and independent, to explore, and to learn how things work. Girls are "taught" to be passive, verbally oriented, and dependent. Boys receive chemistry sets, building toys, trucks and sports equipment; girls receive dolls, kitchen equipment, and sewing and embroidery kits. Parents' expectations that their children's interests and achievements will follow traditional sex roles can steer girls away from certain areas; in contrast, encouragement from parents to succeed in math, science and technology is crucial in a girl's decision to take these courses in high school.[10]

■ **Curriculum materials.** By the time they reach elementary school, children have already felt the pressure to conform to society's expectations of sex-appropriate behavior and interests. In school, textbooks and curricular materials may perpetuate negative stereotypes and biases. It is clear that the language and the content of instructional materials influence students' perceptions of reality as well as their behavior. Sex-biased materials give the impression that females are not important enough to be included. Stereotyped portrayals of females and males restrict pupils' beliefs about who can and who should engage in a wide variety of human activities.[11] For instance, the view that science and math are "white males' " subjects is reinforced by materials that rarely—if ever—portray women and girls as scientists or mathematicians, and by sex-stereotyped examples that often favor boys' interests. Even fewer are illustrations of minority or disabled scientists.

■ **Participation and achievement.** Differential treatment on the basis of sex makes a critical difference as girls and boys progress through school. In the early grades girls perform better than boys on mathematics achievement tests. As they get older, girls' and boys' scores even out, and by high school the scores for boys are higher than for girls.[12] Interest in scientific phenomena and participation in science activities show a similar pattern. Girls' desire to participate in science activities diminishes as they progress through school, as does their achievement and the number of their actual experiences in science.[13] Their lower interest and achievement can be attributed, in part, to the fact that girls may be steered away from scientific experiences such as field trips or working with instruments, laboratory equipment and techniques, and other materials.[14]

Not only are girls at a disadvantage because they have fewer basic science experiences, but also because they are less likely to take a full college-preparatory series of mathematics and science courses in high school.[15] Thus, they are potentially "filtered out" of many college majors such as science, management, engineering, and medicine, all of which typically require several semesters of high school mathematics for admission.

■ **Sex role stereotyping.** Whether or not students enroll in science and math courses in high school is closely related to their perceptions of those subjects' relevance to their current and future lives and to their estimation of their ability to succeed in the courses. In one study, sociologists found a strong correlation between how high school girls expect to allocate their time between employment and the home and the type of occupation they planned to pursue. Girls who show a stronger commitment to join the labor force rather than stay at home are more likely to choose male-dominated occupations. In contrast, girls who expect to marry early, who would prefer to be homemakers at age 35, and who do not believe families benefit when wives work outside the home are more likely to select a traditionally female occupation. Such expectations color girls' course selection very early, often causing them to ignore advanced math or science courses and thereby closing off the option of entering quantitative fields.[16]

Girls may be confused about realistic and appropriate ways to combine career and family. Counselors and others may tell them that professional careers in traditionally masculine fields are now options for them but, at the same time, girls may see their mothers struggling to balance work outside the home (typically in traditionally female occupations) and domestic responsibilities so that the possibility of combining a demanding career and a happy home life seems remote. These conflicting messages may deter girls from considering careers in traditionally male fields.

Additionally, even girls who do expect to work full time outside the home typically view science- and math-based careers as "masculine" and therefore avoid them. They simply do not envision themselves working as engineers, biochemists, or business executives.

■ **Peer pressure.**

Not everything has changed. My daughter, in the seventh grade, won a math contest. In the eighth grade, another contest was held, but I found the contest form on her desk and asked her why she hadn't sent it in. She started to cry and said "I'm afraid I'll win." She had been getting pressure from the boys.[17]

Those high school girls interested in nontraditional studies may be subject to even greater pressure: they may be viewed as nonconformists, as "grinds," or as "tomboys" at a developmental period when conformity is highly valued. Girls studying science describe themselves as less feminine, less attractive, and less popular.[18] Fear of peer rejection may lead some young women to lower their career aspirations and even to discontinue advanced math and science courses. At a time when social interests prevail, girls do not want to compete with boys. For example, despite the fact that girls and boys do equally well in computer classes, even the brightest girls often do not join in the boys' after-school computer clubs.[19]

Computers often become the intellectual equivalent of sports, and the game can get rough. In one high school, teenage boys were telling girls they were stupid in order to discourage them from registering for after-school computer courses. The boys admitted they were harassing the girls deliberately so they themselves could have more computer time.[20]

■ **Role models.** Role models such as teachers, parents, community members, or famous persons can have a strong influence—positive or negative—on girls' academic and career choices. What seems to be critical for girls in deciding to pursue traditionally male interests is their ability to identify with a positive role model in whom they can see similarities between their own self-image and their image of a successful scientist/lawyer/entrepreneur. At one school a visit from a competitive and intimidating Nobel Prize-winning scientist reinforced the inaccurate view that only the most brilliant and aggressive female can achieve anything in science. Subsequent visits, however, from two successful women chemists who told of receiving C's in freshman chemistry in college encouraged the high school girls, many of whom believed that they had to be better than any boy to find a place for themselves in science.[21] This story illustrates the importance of having many role models available to girls.

One of the first and most influential role models young women encounter is their science teacher. Teachers most likely to successfully encourage girls in science routinely provide opportunities for hands-on lab activities; encourage participation in extracurricular science projects and clubs; avoid sexist humor and sex-stereotyped examples; provide a wide range of activities appealing to girls and boys; do not let boys dominate activities; and are unique in their emphasis on careers and further education.[22] Unfortunately, many math and science teachers may have lower expectations for girls, minorities, and disabled children, thereby reinforcing math and science as subjects only for the "elite." A common influence on boys' and girls' school and work decisions, and one that very often persuades girls to ignore math and the sciences, can be termed "counter-role modelling."[23] Teachers, whether in science or in the humanities, often allow students (mostly female) to believe that science and language skills are not complementary. Not surprisingly, young women infer from these attitudes that there is no purpose or reason for students who are good at writing and history, for example, to prepare themselves in science as well. A consultant to a private girls' school illustrates this point: "...the biggest problem in persuading girls to take more science and mathematics did not reside in the science faculty who were hungry for and very willing to teach girls but, rather, among the humanities and history faculty who gave the girls the wrong impression that the only important thing for them to master for college entry and success was writing and research in the nonscience subjects."[24]

In summary, young women's academic and career decisions are influenced by a variety of personal, social, and educational factors that often send them conflicting messages about which career paths are realistic, which are possible, and which are appropriate. What happens to young women interested in traditionally male careers when they enter postsecondary institutions? These women begin college with certain assumptions and expectations about their abilities and their goals. To what extent are these assumptions and expectations supported or countermanded? To what extent do postsecondary institutions encourage women to broaden their options? What impact do their college experiences have on their prior beliefs and expectations about these fields? What factors, both educational and personal, encourage women to enroll in nontraditional programs? What factors predict that they will persist in science, mathematics, computers, engineering, and business majors? The following discussion explores these questions.

Women Who Choose Traditionally Male Fields

In order to recruit and retain more women in traditionally male programs in college, it is important to know who currently chooses these fields and what characteristics of these students can be identified as predictors in the choice of nontraditional study. Men and women students who choose a science major tend to be very similar in mean SAT scores, grades, educational level of parents, and commitment to a science major early in their freshman year. However, men and women differ somewhat as to which factors influence their choice of a science major. Women's choices tend to be shaped more by their family background, by their aptitude for mathematics, and by a need for autonomy. Men's choices, in contrast, are more likely to be influenced by their commitment to a major before college and by their success in science and mathematics courses during freshman year.[25]

For both men and women students, enjoying a science course more than other courses during their first year is a significant predictor of a science major. In one national study, the fact that more men (49 percent) than women (31 percent) found a science course the most enjoyable of their first-year classes partially explains the sex difference in the choice of a science concentration.[26]

Other variables that have been shown to predict which women are more or less likely to choose science majors in college are:

- Female science majors have a somewhat higher probability of having mothers working at relatively prestigious occupations.
- Those female students who had positive attitudes toward mathematics in high school and/or had taken more courses in mathematics were more likely to major in a science area.
- Those women who reported having been influenced by their high school teachers and counselors in making college plans were *less* likely to major in science.
- Having high educational goals and high grades is strongly related to the decision to major in science for both men and women.
- As was the case in the study of high school girls mentioned earlier, women students who placed a high priority on traditional family structure and personal life when they were surveyed as college sophomores were *less* likely to major in science.
- Women who chose to major in a scientific field were more dissatisfied with the academic aspects of their lives in college.[27]

Differences in factors that influence women's and men's decisions to study engineering have also been identified. Women's enrollment in engineering programs was more likely to be influenced by direct recruitment efforts than is men's enrollment. Family and friends play a less important role in encouraging women's enrollment than they do for men. Additionally, many more women than men see their first semester in college as a way to test whether engineering is the right field for them. In short, women are much more likely to be influenced by special recruitment efforts and are more tentative in making a decision to study engineering, that is, they may need more support and encouragement.[28]

The Quality of the College Campus Environment: A Major Factor in the Retention of Women

When I had interviews, not one school asked why I wanted to be a doctor. They wanted to know why, as a pretty woman of 25, I was not married and when I would get pregnant.[29]

At what point do women "drop out" of traditionally male fields? There is no doubt that many potential female scientists, engineers, mathematicians, and so on abandon these interests before they reach college or university. At the college level this process seems to continue: of those women who entered college considering a major in science, only 50 percent actually chose a scientific area (69 percent of the men did so).[30] In addition, women are less likely than men to obtain graduate degrees: while women receive 29 percent of the bachelor's degrees in science and engineering fields (1983), they receive 25 percent of master's degrees (1983), and only 18 percent of doctorates (1984.)[31]

The retention of women in traditionally male programs is strongly linked with the quality of their college experiences. There is increasing concern that while women students may have equal access to institutions of higher learning, their opportunity to develop self-confidence and to have their academic goals and career aspirations validated by faculty and administrators is significantly unequal to that of their male peers. Behaviors and attitudes that express different expectations for women or single out or ignore them because of their sex put women students at a severe educational disadvantage. Overtly sexist behavior as well as more subtle differential treatment can have a profound negative impact on women's academic and career development by:

- discouraging classroom participation;
- discouraging students from seeking help or advice outside of class;
- causing students to drop or avoid certain classes, to switch subspecialities within majors, or to switch majors, and in some instances even to leave school;
- discouraging more informal contact with faculty and others in authority that is crucial for future professional development;
- dampening career aspirations; and
- undermining self-confidence.

While these doubts and concerns can affect all women students on campus, women in traditionally male programs are often particularly vulnerable because negative attitudes and behaviors toward women may be more firmly entrenched in these fields.

The Nature of Male-Dominated Fields

One anthropologist who has gone to a number of energy conferences remarks how widespread the view is that solar energy is feminine and silly. Nuclear energy, you know, is bigger *and riskier and therefore by definition more important.*[32]

Differences of opinion in medicine are often "resolved" in male style, i.e., with raised voices, threatening body language, and insulting language. I think that I am not alone in having felt a difficult, if not intolerable, squeeze between defending patients' "bottom line" rights and personally upsetting interactions with co-workers. This is a problem encountered daily.[33]

Historically, the fields of mathematics, science, business, engineering, medicine, and law have been viewed as "male" domains with men being the vast majority of recognized thinkers and doers. That is not to say that women have not participated in or contributed to these professions. It is to say that they have been underrepresented, that their work has been often undervalued or perceived as marginal.

It is not surprising that the prospect of a high-salaried, prestigious career makes these fields attractive to students, men and women alike. Yet, at many colleges and universities the programs in math, science, engineering, and to some extent, business, are characterized by a number of factors that makes them more inhospitable to women than to men. For example, to become an engineer, physicist, or computer scientist, a student must virtually arrive on campus expecting to major in that field; that is, the curriculum is so tightly organized that late starts are difficult. Yet typically, women are less likely than men to have decided on a course of study by the end of their freshman

year, so that many women are at a disadvantage when trying to enter these fields.[34] In addition, students who are undecided about a major are unlikely to "browse" in physics or engineering courses as they might in other disciplines. Popular classes, such as computer science, may even be closed to nonmajors because of overcrowding. At the graduate level, women fare better in M.B.A. and law programs where students are able to enroll with almost any undergraduate major. Not so in the physical sciences, computer science, or engineering, which usually require a strong undergraduate background in the field.

Often these fields are not only dominated by men in terms of numbers, but their operating procedures, values, and power structures could be termed "masculine" in the sense that they emphasize hierarchy, individual prowess, and highly assertive behavior instead of cooperation.[35] For example, women at one school admit that they are at a disadvantage when competing for scarce computer time because the accepted way of gaining access to computer terminals is to be physically and verbally aggressive. The atmosphere in many popular and overcrowded science classes, as well as in law, is described as being akin to "boot camp." Women are often unprepared for and/or unwilling to put up with such "weeding out" techniques, as indeed are some men. Whether this type of atmosphere is crucial for the training of professionals can be debated. The question remains as to whether more women would be attracted to these fields if they were not so alienating in nature.

Unlike some departments on campus, those representing traditionally male fields have been slow to incorporate women researchers and their work into the curriculum. While women of undeniable talent have occasionally been acknowledged, their work is frequently dismissed as unimportant and irrelevant to the work in the field. On a more overt level, the curricular materials that are used often are very male-oriented and may even be blatantly sexist. For example, countless medical school lectures have been "livened up" by slides of nude or provocatively dressed women. Additionally, in math and science classes, problems and examples are often couched in terms that are more familiar to males. For example, statistics problems involving combustion engines or torsion springs leave many women at a disadvantage when they must try to understand unfamiliar terminology and situations as well as do the math.

One aspect that may be more problematic for women than for men is the quality of math and science teaching. Sheila Tobias has organized a project, "Peer Perspectives on the Teaching of Science," in which nonscience professors in the humanities and other nonscience fields give science professors feedback about the aspects of their presentations and assignments that are confusing, ambiguous, unhelpful.[36] She concludes that "poor" science teaching—where it exists—is an essential ingredient in the unwillingness of many able but not yet overly committed women students to make a commitment to math and science fields.

Traditionally male fields are often characterized by a very low percentage of women faculty. Women students may find that there simply are not enough female mentors/advisers to go around. The women faculty and administrators who are there may be overworked, especially in terms of service on committees that otherwise would have no women members. Thus they may have little extra time for informal or formal advising loads. They may be viewed by their colleagues as out of the mainstream of the department and as having marginal influence on the success or prestige of the department/school. They may have no real power to work on behalf of women students. Indeed, successful women faculty and administrators often face peer pressure when they raise women's issues; to do so is to risk losing their credibility and their membership in the academic inner circle. Unfortunately, women who involve themselves heavily in committee work and extra advising, to the detriment of their research and publishing records, may find it difficult to obtain tenure. Many women faculty are unwilling to pay such a high price and therefore are unable to provide the help younger women colleagues or students may need. Some women who have managed to succeed in traditionally male fields against quite substantial odds (in contrast to fields where women have been more easily accepted) may be less than sympathetic to other women's concerns. In many instances these women faculty and administrators, like their male colleagues, have gone through school and worked in academe with no or very few female colleagues. They also may be unaccustomed to and uncomfortable with women students.

On Being a Woman in a Traditionally Male Field

A student who thinks she might like to be an astronomer will often enter a department where she will be the only woman student; there will be no women on the faculty. If fortunate, she will find a sympathetic adviser and congenial colleagues with whom to study. Even so, she will be treated differently from male students. One faculty member may proclaim openly that he doesn't want a woman to work with him. Her work will be scrutinized with a care that most of her male counterparts will be lucky enough to escape. She will stand out in everything that she does. And if she persists and obtains a degree, her adviser may well sit her down and suggest that she not set her sights too high in seeking a postdoctoral position.[37]

It was not that I particularly wanted to be fishing and chewing tobacco with the public finance person at my school, but the guys that did were pushed through by him (even given thesis topics!) while I struggle just speaking to the man.[38]

Women and men students enter college with different educational experiences—even if they have attended the same elementary and secondary schools. Women may have different ideas about what to expect in traditionally male programs. These ideas may in turn lead them to react differently from male peers to what appear to be similar experiences. Even behaviors and attitudes that on the surface seem equitable may, in fact, be damaging to women. For example, women and men alike may receive encouragement to be ambitious and successful but women may then be subtly excluded, misdirected, exploited, or not supported and rewarded in numerous ways. Bright, talented women may

be recruited aggressively by schools but then advised to pursue limited or unchallenging educational and career paths. They may be generally encouraged but then not provided with any specific kind of support or reward (for example, financial aid or research assistantships). Women may be encouraged in nontraditional pursuits but then excluded from informal exchanges with faculty and peers that would help enhance further development. Some faculty may treat them well but others may take advantage of them, either professionally or sexually as when a faculty member takes all the credit for a co-researched project or when another professor tries to trade sexual favors for good grades.[39] These forms of "supportive discouragement"[40] are pervasive and sometimes are so routine that they seem quite normal.

Two previous reports on the climate for women students[41] identified the "micro-inequities"[42] that occur in everyday interchanges and by which women are singled out, overlooked, ignored, or discounted. They are called "micro-inequities" because they can seem like small differences in treatment. But when women students are subjected to these attitudes and behaviors again and again, the behaviors create a hostile environment to learning and one that maintains unequal opportunity. Although they can affect women students at all levels and in all fields, these attitudes and behaviors are particularly troublesome for women in traditionally male fields.

Women in these fields may be subject to a variety of pressures not generally experienced by their male counterparts. For instance, when their numbers are small, women may be overly visible within their departments and may, as a result, be subject to greater scrutiny. Consequently, women may feel increased pressure to succeed, less confident of their abilities, less willing to take risks, and less able to negotiate for their needs. Not surprisingly, in fields where women are less numerous, they report feeling less self-confident and assertive than those women in fields where women are more numerous.[43] Women may believe that they must prove themselves worthy before being accepted or taken seriously, or that they must perform better than men students in order to be considered equal, and to some extent they are right. Many women also feel that they are being judged as representatives of their sex—and in the case of minority women, as representatives of their sex *and* race—and feel pressure not to let other women down.[44] Such pressure on women can lead them to develop extraordinarily high standards for themselves as a prerequisite for staying in the field, so that women with grades and competencies equal to those of their male peers may nevertheless be disappointed in themselves and end up dropping out or changing fields.

Women may be uncomfortable with the male "locker-room" atmosphere, that is, with the competitive, aggressive standards of behavior that can pervade these areas. In a survey of 400 women scientists who were asked to name the most important factors omitted from their education that would have better prepared them as women for science careers, they listed as most critical assertiveness training; methods for gaining self-confidence; advice on how to work with men and how to play office politics; training in business and management techniques; and courses in communication and human relations.[45] Undeniably, if women are to succeed in traditionally male fields they must learn to "play the game." However, of equal importance to women's success is the necessity for faculty and administrators to encourage and adapt to the greater participation of women.

Many women, especially in graduate departments where women are very few, may feel isolated. Each sex is often more comfortable with its own members, and the implications of this for women in traditionally male fields are substantial.[46] Not only are these women much less likely to find female faculty and other women in high positions to serve as effective role models, they are much more likely to work with professors who are not accustomed to having women in their classes. The absence of women at all levels in these fields sends a not-so-subtle message to students that women may not be welcome in the "club" and will probably have a significantly harder time trying to join. Men predominate in teaching, research, study groups, and so forth, and to the extent that they are still uncomfortable dealing with women as actual or potential colleagues, women will be excluded from many collegial interchanges.

Because men more frequently have access to information about what is going on, both in the institution and in the field, and because men talk more to each other, often sharing information and advice, women are at a distinct disadvantage. This "old-boy network" may be more firmly entrenched in fields where women have been relatively absent and result in women's status as "outsiders" begin considered the norm. Additionally, because women have few other women with whom they can relate and share experiences, they may feel particularly lonely and susceptible to the idea that they do not "belong." In contrast, the presence of other women students and women faculty can be termed the "comfort factor." Evidence for the importance of the comfort factor in women students' success in traditionally male fields comes from research which shows that graduates of women's colleges are twice as likely to attend medical school than those women graduating from coeducational institutions.[47] Graduates of women's colleges are also twice as likely to have earned research doctorates.[48] The high ratio of women faculty to women students, with the concomitant increased opportunity for students to interact with women faculty, as well as the opportunity to learn in a less male-oriented environment, can make a critical difference for women students.[49]

Special Concerns of Minority Women, Older Women, and Disabled Women

It was pointed out to me that I was female and a minority and otherwise would not be at Stanford. Also [there would be] no way I would be able to pass qualifying exams, etc., etc. . . . Several times I nearly gave up because of this.[50]

I feel very isolated and alone. I rarely have another Black student in class. I've never had a Black professor. It is difficult to find other Black graduate students on a large impersonal campus! I often feel that the faculty doesn't think I'm as "smart" as the white students. I have been forced to borrow from relatives which is quite demeaning to my self-concept at age 38![51]

One professor argued against my getting a degree at 35, pointing out that I would have a limited professional life because of my late start and he would be wasting a slot for a more promising student. I wanted to point out that I was probably going to live longer than some of the men who would die in their 40s or 50s, and that with my late start I'd be less likely to leave the field.[52]

■ **Minority Women.** Minority women students—American Indians, Asian-Americans, Blacks, and Hispanics—often face "double discrimination": once because of their sex and once because of their race. Whites—both male and female—can be uncomfortable dealing with minority women and act on the basis of a variety of misassumptions. Additionally, women from some minority groups may be especially likely to be viewed in terms of their sexuality, which often leads to increased sexual harassment or to a "keeping of distance" by some male faculty and administrators. Similarly, some academic advisers underestimate the competence of minority women and thus counsel them to lower their sights or misdirect them on the basis of stereotypes—steering Asian-American women into mathematical and technical fields, and Hispanic women into the service and health professions.

Like women students who often feel more comfortable with women faculty, minority students are often more comfortable with minority faculty.[53] Given the lack of women faculty, or minority faculty of either sex, minority women often feel severely isolated with few or no people available to serve as role models, mentors, or peers. Minority women are even more likely to be excluded from informal and social interactions—sometimes by white women as well as by men.

These factors can add up to a very chilly environment for minority women and one that often compromises their academic and social experiences. In fact, compared to white students, both male and female minority students more often cite nonacademic reasons such as social or cultural alienation or lack of support for considering dropping out.[54]

Frequently, approaches to recruiting and retaining minority women (as well as majority women and minority men) are based on a "deficit model," that is, on the assumption that all problems reside *in* the student and if the institution can sufficiently change the student, then the individual will fit into the environment and function effectively.[55] However, a more comprehensive approach that seeks institutional change to bring about a more encouraging environment as well as special academic and support programs works most effectively. Supportive and accessible faculty—including minority faculty—increased numbers of minority students, strong minority support services, and a community that provides cultural and social support are crucial to the successful recruitment and retainment of minority women.

■ **Older Women.** Many older women have been away from academic life for a number of years. They may fear not being able to keep up with the work and their younger colleagues. Many returning women students are married and/or have family and child care responsibilities. Their time is less flexible; therefore policies and practices, such as limited office hours and the like, which are geared more for full-time, traditional-age students, may cause undue hardship for older women.

Problems faced by older women on campus are frequently exacerbated by discrimination based on age. Issues that concern all women in traditionally male fields such as being taken seriously by faculty and administrators are especially problematic for older and married women. Faculty may feel that older women are just "dabbling" and are wasting the institution's resources. Faculty may be uncomfortable with students the same age or older than they are. This may contribute to older women students' being treated differently in consultations with faculty and staff, and excluded from informal interchanges.[56]

■ **Disabled Women.** Disabled women face discrimination based on their disability as well as their sex. They often must cope with even greater social and institutional "invisibility." Largely because they may not understand disabled women's actual capabilities and needs, peers, faculty, and administrators may be especially uncomfortable in dealing with these students on a one-to-one basis. Disabled women often must deal with people ignoring them, talking to them in a patronizing way, overexplaining things as though physical disabilities imply mental limitations as well, and counseling them toward only a narrow range of majors and careers.

The paradox of "underattention" and "overattention" experienced by women in general is often heightened in the case of minority women, older women, and disabled women. They are still anomalies on campus. On the one hand, their problems and concerns may be ignored; on the other hand, they may be singled out as representatives of their special groups and more closely scrutinized.

Stereotypes

A man and his son were riding a motorcycle and got into a serious accident. They were both unconscious and rushed to the hospital. It was established that the son needed surgery immediately. He was wheeled into the operating room when the surgeon walks in and says: "I cannot operate on this patient for he is my son." How is this possible?[57]

There are . . . problems with being a woman in medicine. One is the "dancing dog" syndrome, which points out that "when a dog dances, you're not impressed by the quality of the dance but the fact that it's dancing at all." This thought lurks in the backs of our minds and attacks at low moments, damaging our self-esteem, and is reinforced by people who are overly impressed that we are women *in our profession rather than by the specifics of what we do or have done.*[58]

Women are often treated not on the basis of their individual characteristics but according to stereotypes about women's appropriate roles and behavior. A campus environment in which these stereotypes are pervasive is especially discouraging to women who are trying to pursue interests and develop abilities that do not coincide with current cultural expectations. Numerous studies, many of them undertaken in academic settings, demonstrate how the perception and evaluation of a person's

behavior and achievements differ depending on whether that person is a man or a woman,[59] and that women's accomplishments are typically devalued compared to those of men.

Devaluation and Doubt

During a grades assignment meeting, a professor decided to give a borderline student the higher grade because she was "cute." When I suggested that this was not a relevant basis for grading, another staff member chimed in, "Yeah, she's not that *cute."*[60]

In my first job as a teaching assistant, the course head wouldn't give me any support. He wouldn't even tell me the class topic until the day of the class. I think he didn't really take me too seriously.[61]

The devaluation that women face is evident in the perception that women are not as serious about their work and are not committed to their studies and future careers. "Why not stop with a B.S.? A pretty girl like you is bound to get married" is still an all-too-common refrain in many departments.

When faced with doubts about their ability and their commitment, many women, not surprisingly, lose self-esteem and career confidence even though they may stay in school and earn good grades.[62] Women's lack of confidence may lead them to participate less in class because they are fearful of being wrong. Similarly, they may be less likely to disagree with their teachers. Their self-doubt is also evident in their explanations for difficulties in coursework. In a study in which first-year students cited a math or science class as their most difficult class, men tended to place responsibility for their difficulties outside themselves, while women were more likely to place the blame internally. Men explained their problems in terms of the inherently difficult nature of the course material or poor performance on the part of the instructor ("It had a disorganized lecturer who was more an entertainer than a teacher"). Women tended more often to cite their own inadequacy as the source of the difficulty ("It was difficult because I didn't give it the attention or time I needed to and it was unlike any math I'd had before").[63]

When women's abilities and contributions are devalued, and the message they are left with is that they are unwelcome or viewed as incapable, much of their time and energy is expended dealing with unnecessary doubts and conflicts. They may choose to shift to "softer" subspecialities or toward more traditionally female majors and career goals. The following sections will describe some of the behaviors and attitudes by faculty, administrators, and peers that can isolate and exclude women in traditionally male fields.

Interaction with Peers: Academic Invisibility and Social Overattention

A male graduate student said, "The problem with this place is that there aren't enough attractive, available female graduate students." Enough for what? I'm not here to be attractive and available.[64]

A male student who had lunch with me a number of times when we were teaching assistants for the same course regarded me as his "territory." I overhead him say to another male graduate student, in reference to a third, "John is muscling in on my territory."[65]

Having lunch with male graduate students seems to signify that I'm going out with them. The same is implied by technical discussions. In short, people seem to assume that I'm going out with any male that I talk to.[66]

Positive interaction with male peers, whether in class, labs, study groups, residence halls, formal extracurricular activities, or purely social settings, helps women students in traditionally male fields to feel accepted as intellectual equals and colleagues. Unfortunately, women are often not taken seriously by male peers and are often treated more as potential dates and/or as objects of sexist humor. As one graduate student reports, "I am uncomfortable about asking certain male graduate students for help (about the systems, project, etc.) because it might be viewed as 'coming on' to them. More times than not, the answer to a question is followed by an invitation to go out."[67] Reactions to this social overattention may lead to general wariness toward male students and reluctance to join in conversations or ask for help.

Many women students on campus experience negative attitudes and behaviors from their male peers regardless of their field. Women in traditionally male fields may have to deal with them more frequently because of the nature of those fields and the fact that women are so new and few, especially at the graduate level. There may be more resistance to women, more hostility, and more doubt about their seriousness and competence.

Women students are less likely to be treated as leaders. For example, they are often relegated to the status of note-takers rather than participants in lab teams. Male peers may tend to disparage women's abilities. A woman student, for example, reports that when an experiment failed, her lab partners (all male), as a "joke," wrote her name on the lab report's "reason for error" line.[68] In one laboratory when women make an error in an experiment, a derogatory taunt goes around the room: "WIS, WIS," the acronym that stands for the organization Women in Science.

Male students may exclude women from informal study groups or interchanges. It simply may not occur to them to do so, particularly if the professor does not include women in field trips or out-of-class discussions.

Women may experience overt sexist behavior and harassment from peers. Women in computer science at one institution report receiving obscene mail through the system, while a picture of a nude woman is sometimes used to demonstrate the system's graphics capabilities. Male peers may deny women access to lab equipment, computers, and so on. One woman reports that a male student would physically push her away from the machine her team was sharing, but never did this to other males.[69]

Finally, some male peers may be suspicious of or even hostile toward women's efforts to improve the climate. They may feel put on the defensive or self-conscious about approaching women, as did some men in response to a report on climate issues in one technical program. However, at the same time, many men reacted positively and felt that attempts to address climate issues for women were legitimate and important steps toward improving the environment for women and men.[70]

Interaction with Faculty, Administrators, and Staff

A faculty member started paying a lot of attention to me—going out of his way to "run into" me, talking to me a lot, and flirting. When I asked another woman student what she thought was going on, she told me that he had made advances to a couple of other students. She was surprised that I had not been warned about him.[71]

Last year (1985) a group of us approached our histology professor for having a Playboy-type cartoon in class. He told us, "Learn the material elsewhere and don't come to class," and that as a patient, he would rather die than see a doctor with no sense of humor.[72]

We [had] a lecturer on the issue of women working on wards; [one problem of which is sexist remarks] . . . she told us that off-color jokes were just made to make us feel better.[73]

Faculty, administrators, and staff in traditionally male fields are more likely to be unused to and/or uncomfortable with women students than is the case in other fields. They may, for a variety of reasons, treat women very differently than men in class and in advising/mentoring situations. Some of the subtle and more overt behaviors and attitudes that can affect women students in traditionally male fields include:

- disparaging women in general, women's intellectual abilities, or women's professional potential;
- focusing attention on women's appearance or personal life as opposed to their performance. A compliment that might be flattering in a social context takes on a different meaning in the classroom. It focuses on her as a woman, to be appraised for her appearance rather than her ability;[74]
- using sexist humor;
- advising women to lower their academic and career goals;
- suggesting that "penis envy" motivates a woman to achieve or strive;
- making disparaging comments about lesbians, or using lesbianism as a label by which to accuse or threaten women;
- giving women less time and attention than men in advising, and in work groups;
- responding with surprise and doubt when women—but not men—express demanding career goals ("Why would you want to major in nuclear physics?");
- treating women in an overly protective or patronizing manner which implies that women are not competent to cope on their own;
- addressing women as "honey," "baby," or referring to them as "girls." Such unprofessional language often makes women uncomfortable by focusing on their sexual role rather than their academic competence, and also equates them with children who are not taken seriously;
- asking women, but not men, questions related to their actual or potential marital or parental status. During an interview at a prestigious medical school, a woman applicant was asked whether she was sexually active, whether she used birth control, and what she would do if she became pregnant while in school;[75]
- not actively encouraging or nominating women to apply for scholarships, fellowships, awards, or graduate school;
- counseling students in accord with stereotypical ideas of "male" and "female" majors and careers, suggesting, for example, that women choose easier subspecialities or fields that are seen as "appropriate" for women. ("Neurosurgery is a rather unusual choice for a woman, why don't you look into pediatrics?" or "I find that women seem to be naturally suited to family law.");
- viewing marriage and family as negative for women, but as an advantage—a stabilizing factor and symbol of maturity—for men. Conversely, how a career affects men's family relationships is rarely considered;
- getting to know men students informally, discussing one's own work, and the students'. Such discussions help students feel involved in the field and give them a sense of themselves as future professionals. A recent survey of men and women graduate students at one school found that men have much greater access to informal interaction with their advisors outside of the advisor-advisee relationship. One female student commented, "My advisor frequently invites only the men to have lunch with him. The females usually assume it is a negative comment on our research";[76]
- creating an office environment that is uncomfortable for or demeaning to women. For example, many women students are unnerved by *Playboy* centerfolds and other "decorations" in advisors' offices; and
- Faculty may be less willing to work with a woman on independent study projects, or to choose them as research or teaching assistants, because they see women as having less potential, and/or are uncomfortable working with women; or because they may be viewed by other faculty and students as making a "play" for the woman.

Faculty's and administrators' attitudes toward the participation of women in science, technology, and the professions is critical for women's success. Faculty are not only advisors and mentors but also the gatekeepers who open doors for those entering the professions. Women students who express the greatest satisfaction with traditionally male fields are those who do well academically and find themselves surrounded by people who offer support, including teachers whom they perceive rate men and women equally for potential success and treat them accordingly. Yet all too often women students face faculty who are unaware that they are viewing men and women differently. A

study of engineering students found that both men and women perceive male engineering faculty members as rating men students as superior in terms of intelligence and having "natural" aptitude for engineering. Both male and female engineering students perceive female engineering professors' ratings to be more fair and related to ability rather than the sex of students.[77]

Conclusion

The relative lack of women's participation in traditionally male fields in school and consequently, in the work force, represents a serious loss of human potential for society and a personal loss for those women who would benefit from the challenges and rewards such a career would bring them. Today, it is important for women and men alike to be science literate, to have an appreciation for and an understanding of the role of science, mathematics, engineering, business, computer science, and law in society. The question of how colleges and universities can best attract and retain women in these fields is complicated but not impossible to answer. By improving the academic and social climate for women on campus and increasing outreach efforts to schools and the community, higher education institutions are in a unique position to bring about needed change.

Evaluating and altering policies, structures, and actions to improve the campus environment cannot be seen as "women's work." The awareness and support of *all* members of the academic community are critical and indeed, to their advantage, for efforts to humanize the institution will benefit everyone. Improvements such as a broader and balanced curriculum, more informal faculty/student contact, and less intimidating complaint procedures, will result in a less impersonal and alienating atmosphere for women and for men. Institutions of higher education owe their students nothing less.

Recommendations

The following are specific recommendations for attracting and retaining women in mathematics, science, law, engineering, medicine, and business programs. In fact, many of them have already been implemented successfully on different campuses. They are aimed at a variety of people—faculty, administrators, counselors, admissions and financial aid officers, recruiters—and many of the recommendations will be appropriate for more than one group. The recommendations will not be suitable for all situations at all institutions; they are meant to be catalysts for ideas. Institutions can use or adapt those most appropriate to their particular circumstances. While individual recommendations are useful, a broad comprehensive approach is more likely to yield results.

The recommendations are organized into general suggestions for improving the campus climate for all students and more specific suggestions for recruiting and retaining women in traditionally male fields. Some recommendations could be adapted easily into programs and policies for *both* recruitment and retention, but in order to avoid duplication they are listed only once.

GENERAL RECOMMENDATIONS

- **Issue a policy statement that emphasizes the importance of an equitable climate for women.** Distribute the statement to all members of the campus community: publish it in the student newspaper, the faculty bulletin and handbook, and materials distributed to all new students and employees at all levels.
- **Ensure that all efforts to improve the climate for women recognize the special concerns of minority women, older women, disabled women, and low-income women.**
- **Appoint a high level administrator to evaluate and improve the climate** for women and minorities and to help coordinate services.
- **Issue a policy statement which makes it clear that overtly biased comments, use of sexist humor, and related behavior on the part of faculty are not appropriate in the classroom or in related learning situations.** Distribute the statement to faculty and students, and publish it in places such as the student newspaper and the faculty bulletin. Include it in materials distributed to new faculty and new students. The University of Miami (FL), along with other institutions, has issued such a statement.
- **Adopt a nonsexist inclusive language policy to cover all written and verbal institutional communications. Screen and edit curriculum materials for gender bias.**
- **Seek foundation and corporate support for programs and special events** such as seminars and conferences for women. IBM Corporation and the International Paper Company Foundation support the Women in Business Program at the College of William and Mary (VA).
- Because the presence of women and minority faculty has a positive impact on the recruitment and retention of women students in traditionally male fields, it is important to **keep statistical data on the progress of women and minority faculty.** The Office for Women in Medicine at Yale University (CT) issues annual reports on full-time faculty at the School of Medicine, including data on sex, degree, number, salary, age, and years at rank.
- **Collect, analyze, and report participation data** by course, level, and sex in order to document inequities. **Monitor women's progress** to identify those at risk for dropping out or those who might need extra encouragement.
- **Teacher training programs should focus on stereotyping and other climate issues in elementary/secondary classrooms** to ensure that girls and boys are being equally encouraged to develop their interests and talents. Often a supportive science or math teacher can make all the difference for girls interested in these fields.
- **Incorporate climate issues into faculty development programs and training of teaching assistants.** A growing number of faculty and graduate teaching assistants in traditionally male fields are foreign-born and may be unused to dealing with women on a collegial basis, or they may come from cultures where the role of women is extremely circumscribed. It is, therefore, especially important to emphasize climate issues in orientation programs for new faculty and graduate students.

RECRUITMENT STRATEGIES

■ **Ensure that all recruiting and admissions personnel are committed to having women at the school and/or programs.** Periodically evaluate their behavior by surveying prospective women students about their experiences.

Pre-college Programs

■ **Consider programs for junior high and younger high school girls as well as older high school girls who are preparing for college.** The program then takes place early enough to have an impact on the girls' curriculum selection in high school. The FEMME (Females in Engineering, Methods, Motivation, Experience) summer program at the New Jersey Institute of Technology is open to ninth-grade girls and is free to participants. The program's goal is to prevent young women from turning away from math and science. Through extensive direct participatory activities and field trips, the program emphasizes building confidence and encouraging academic preparation.

■ **Develop a role-modelling program for high school girls.** The University of Michigan Summer Internship in the Sciences for High School Women places students in the laboratories of women scientists where they gain hands-on research experience and positive reinforcement for their math and science interests. The program also encourages interaction among the girls, scientists, and staff by sponsoring weekly information and support sessions. After their internship, students report their research experiences and results to a public audience. (See the Resources section, p. 17, for a guide to adapting this model program.)

■ **Conduct follow-up surveys after workshops or other activities** to assess what was most helpful for students and teachers and what aspects of the program/presentation could be improved. Also, find out from previous female student participants how many of them are now interested in pursuing, or have enrolled in, traditionally male fields.

■ **Sponsor workshops and seminars for classroom teachers, counselors, curriculum specialists, and administrators serving elementary/secondary schools** on methods to attract and retain girls and minorities. For example, EQUALS at the Lawrence Hall of Science at the University of California-Berkeley offers just such inservice workshops to help increase the participation of young women and minority students in mathematics. The School of Engineering Technology at the University of Arkansas at Little Rock held a Counselors' Workshop at which technical career fields and opportunities for women and trends in engineering and technical employment were discussed. Panelists included women professionals, faculty, and current students.

■ **Encourage women faculty, staff, and graduate students to visit high schools** as speakers or at "career day" functions. This not only provides girls with role models but also shows boys that women can be physicists, engineers, or lawyers. (These activities should be recognized as community service requirements for tenure.)

■ **Sponsor a program for women faculty and graduate students to serve as "big sisters"** in science, engineering, business, and law to local high school girls. The Omicron Chapter of Graduate Women in Science sponsors a "Big Sister in Science" program with professional women serving as career and educational mentors.

■ **Sponsor a day on campus for high school guidance and career counselors and math/science teachers.** Show them the opportunities that exist for women students at your school. Do the same for first-year women (and their parents) who express an interest in traditionally male fields.

■ In conjunction with the program for high school counselors and teachers, or separately, **invite high school students to campus for a day of career awareness activities.** The Stevens Institute of Technology (NJ) sponsors a conference, "Explore Engineering," which features engineering demonstrations, panel discussions on topics such as a typical day at work, opportunities in various fields of engineering, and careers in related fields such as management, medicine, and law. Emphasis is also placed on high school preparation, college selection, the first year in college, and approaching an engineering career as a woman in a traditionally male field.

■ **Consider sponsoring a "mini course" or several weekly sessions** to introduce high school girls to subjects such as business, law, math, or science.

■ If a separate team of women students and faculty cannot be put together from fields where women are underrepresented, **ensure that the regular admissions staff visitation team talks about the opportunities for women** in traditionally male fields and has handouts about the programs to distribute.

Summer Programs

■ **Sponsor a variety of summer outreach activities** designed to attract high school girls to traditionally male fields. The Radcliffe Summer Program in Science, a joint project of Radcliffe College (MA) and the Harvard Summer School, brings high school girls to campus for eight weeks. A required course, "Frontiers in Science," introduces students to new developments in scientific disciplines, and elective courses range from astrophysics through cell and marine biology to calculus and microcomputer organization and programming. Students also participate in the Career Conversations Program in which they meet informally with women scientists. Site visits to local scientific centers give students a chance to talk with professionals in the field. At Mount Holyoke College (MA) a similar program, Summermath, is offered for high school girls interested in mathematics. The six-week program encourages girls to stay in the math field by giving the students confidence and skills, by introducing them to female role models, and by demonstrating the "real-world" applications of math.

■ **Publicize summer program activities widely.** This increases the interest among students in addition to those who actually apply or attend the program.

Academic Year Programs

■ **Coordinate recruiting programs and research activities with other colleges and universities.** In a program started in the summer of 1986, Dartmouth College's (NH) Thayer School of Engineering invited three liberal arts majors

from Smith College (MA) to take an introductory engineering course and assist in research for the summer. The women students received free housing and tuition and stipends for their research work. By beginning the pilot program with Smith, Dartmouth hopes to attract more women students. The students are encouraged to continue for a term or two before returning to Smith to complete their liberal arts degree. The graduates may then enroll at Dartmouth to earn a degree in engineering.

The Ad Hoc Consortium consisting of the College of St. Catherine (MN), Mount Holyoke College (MA), New Jersey Institute of Technology, Skidmore College (NY), and Sweet Briar College (VA) attempts to attract high ability women students to major in chemistry. A conference is held in Washington to bring faculty and selected students together with Ph.D. chemists from industry, museums, and unusual occupations in the field.

■ **Offer varied activities aimed at students, teachers, counselors, men and women** such as exhibits, demonstrations, faculty open houses, tours of facilities, workshops, films, visits to classes, or "mini-courses."

■ **Build links with other organizations in the community that run programs to expand women's career opportunities** such as nonprofit groups, the YWCA, state agencies, and community colleges.

Printed Materials

■ **Evaluate campus media, including the college catalogue, flyers, brochures, and posters** to ensure that women are portrayed as being involved in traditionally male fields as well as other fields.

■ **Document, publish, and make available proceedings and materials of conferences, workshops, and model programs dealing with women in these fields** so that other schools and programs will be able to replicate and adapt your experience. For example, the Inter-American University of Puerto Rico publishes and sells materials developed as part of a research project on career counseling for university women.

■ **Assemble and distribute recruitment literature packets to women students and counselors.** Include biographical sketches of women in the field, materials concerning women in technical careers, a description of technical education programs in your school/region/state and the secondary school preparation they require, and specific information on services available at your school.

■ **Develop mailings and materials especially aimed at prospective women students.** For instance, a woman expressing interest in the engineering program could receive not only brochures describing the program but also a letter from a woman engineering faculty member.

■ **Develop publicity materials**—such as brochures, flyers, and posters—that highlight women in traditionally male fields to encourage women students to seek information on your school's programs. Also, distribute these materials at local and regional high schools and community colleges. Make sure that all campus publicity materials currently in use portray women in a variety of nonstereotypical settings.

■ **Feature women in regular ongoing campus publications.** For example, profile women faculty and students in the alumnae/i magazine. Not only will such articles be of interest to readers, but reprints can be used to send to prospective students.

■ **Use news releases to highlight women's achievements and activities.** These also can be reprinted and used in recruitment. Many institutions do this regularly.

■ **Materials not generated by the institution—that is, magazine and journal articles on the status of women in various fields—can also be used in recruitment packets.**

■ **Publish a newsletter for and about women** in various schools or departments. Purdue University (IN) publishes a quarterly newsletter, *Feminengineer*, for women in its School of Engineering.

Other Promotional Materials

■ **Use public service announcements** on radio and television to publicize activities on campus such as open houses, competitions, seminars, and preregistration.

■ **Develop slide shows or videotapes** to use in outreach activities or to show to potential funders of programs for women in traditionally male fields.

Special Groups of Women

■ **Develop outreach programs for women in rural areas.** At Jefferson College (MO), the Missouri Women in Nontraditional Careers program offers courses in machine-tool technology, construction, and agribusiness, as well as up to 100 percent financial aid, day care services, and guidance counseling.

■ **Four-year college and university outreach programs should focus on encouraging and supporting women in two-year programs to enter advanced degree programs.** A large percentage of women, especially minority women, enter postsecondary education at a two-year college in vocational and technical programs. But they often stop there. The Minority Women in Management program at Polytechnic University (NY) enrolled women students, identified by counselors and staff from City University of New York, into a combined B.S. and M.S. degree program in which they earned an M.S. in management within three years. The students received supportive counseling and refresher courses in mathematics.

■ **Ensure that outreach programs for high school students include female minority and economically disadvantaged students from local and regional public high schools.** The Windows Into Science Enrichment (WISE) summer program, funded by the William Penn Foundation and offered at Bryn Mawr College (PA), offers Philadelphia public high school students free tuition and a $240 stipend for the four-week program. In addition to hands-on experience and field trips, students also learn how to apply to college and get financial aid.

■ **Extend opportunities for study to women in the community, especially women who have been out of the work force or who hold degrees in non-science fields.** Augment these programs with internships, refresher courses, and services for single parents. The University of New Mexico-Los Alamos offers training for women in high-demand fields such

as computer science; electronics, mechanical, and chemical technology; and pre-engineering. Patrick Henry Community College (VA) offers unemployed and underemployed women a nine-month course, "Breaking Barriers: Women at Work," which introduces them to a variety of nontraditional career skills. The program provides financial aid for tuition, child care, transportation, books, and other college costs.

RETENTION STRATEGIES

Advising

■ **Ensure that all women students in scientific, technological, and professional fields have access to advisors and mentors,** both faculty and other students. First-year women in traditionally male fields especially may need extra attention and support both academically and personally. The Women's Science and Engineering Network at Stanford University (CA) consists of graduate and postdoctoral women who act as mentors to undergraduate women. The mentors help the younger students develop self-confidence, clarify their career goals, interact better with faculty and peers, and deal with the pressures of being in male-dominated fields. The benefits work the other way around too. For instance, the graduate student mentors find they feel less isolated and their morale is given a boost.

■ **Schedule regular meetings with women students and faculty in traditionally male fields to discuss academic and career goals.**

■ **Institute exit interviews for women transferring from "traditionally male" to "traditionally female" fields,** or dropping out altogether, to determine if an inhospitable climate has been a significant contributing factor.

■ **Hold regular workshops to help women prepare for the challenges of graduate study** in traditionally male fields. Issues such as gauging the supportiveness of faculty and advisors, handling differential treatment, and confronting self-doubt could be discussed.

■ **Hold meetings geared to male students in science, math, engineering, law, and business** to discuss their roles and attitudes toward women both professionally and personally. These could be led by male faculty and/or student services staff. Discussions between men and women can be helpful.

■ **Avoid communicating sex-typed expectations** regarding fields of study, co-curricular activities, and careers. Be alert not only to overt discouragement ("That field is too difficult for a woman") but also to more subtle behaviors such as withholding approval or expressing doubts that are unwarranted by the student's record. Encourage women students to pursue traditionally male majors and subspecialities when these areas reflect the particular student's interest and abilities.

■ **Faculty should make an effort to gain an understanding of the differential treatment** that women and minorities are likely to encounter. At one institution, faculty in physics, geology, and other natural sciences read biographies and autobiographies of minority and women scientists to help in their advising and to provide examples to help their advisees with common pressures.

■ **Hold pre-orientation workshops for faculty and student assistants** who advise or teach first-year women and minority women. Discuss barriers to women in traditionally male fields, the importance of role models and mentors, and the availability of special campus programs, such as remedial math.

■ **Offer career programs to address specific problems minority women may face in career counseling.** Identify minority women working in traditionally male fields to serve as models/mentors to women students.

■ **Counselors should provide up-to-date career information and describe new job options in various fields.** They should ensure that students understand the nature of these fields and the kinds of professional opportunities within them.

Role Models

■ **Develop and review procedures to recruit more effectively women and minority faculty members** in traditionally male departments. The University of California funds the President's Fellowship Program, which awards more than half a million dollars in fellowships to women and minority postdoctoral students who hope to become university faculty members. Applicants from the fields of business, engineering, computer science, mathematics, and the physical and life sciences are given preference.

■ **Bring leading women in their field—for example, scientists, engineers, and executives—to campus** as speakers and to present their research. Publicize these events widely. The Center for the Study of Women at the University of California-Los Angeles sponsors a Women in Science Colloquium Series. The Warner-Lambert Visiting Scientist Lecture Series at the University of Michigan invites women scientists from around the country to give presentations in various science departments and campus-wide.

■ **Bring in younger alumnae and those not too far along in their careers.** In this way, women students can relate to "ordinary" people in these fields as well as the "stars."

■ **When professional women are invited to campus as guest lecturers, have them meet with students** specifically to discuss the climate barriers they may have faced and how they approached them. Women students may benefit from learning how successful women cope in male-dominated fields, balance family and career, and deal with other problems.

■ **Develop a network of female minority alumni, faculty, and staff,** plus those from other groups, who are interested in advising or participating in minority students' activities.

Social Support

■ **Ensure that your department has access to information from women's professional and educational associations** (some of which are listed in the Resources section, p. 17) and that women students are aware of the services and support (sometimes financial) these organizations offer. For instance, the Association for Women in Science Educational Foundation offers yearly financial awards to graduate student researchers.

■ **Inform entering women undergraduates and graduate students about campus resources** as soon as possible, including people and offices on campus that can provide support and

services on campus. Listing these in orientation materials is helpful, as is discussing them during any orientation meetings.

■ **Compile a directory of local women** in various traditionally male fields from academia and industry who are available for programs and consultations. The Women in Science Program at the University of Michigan publishes the *Resource Directory of Michigan Women in Science*. In addition, compile a list of women involved in traditionally male fields (students, faculty, and staff) on campus.

■ **Hold regular workshops and/or brown bag lunches** to discuss career opportunities and issues of concern to women in traditionally male fields.

■ **Keep current information on campus and national organizations** concerning women in traditionally male fields. Include professional associations, student groups, and campus clubs. The University of Michigan Women in Science Program publishes *Organizations of and for Women in Science at the University of Michigan* and *Resource List of National Organizations of and for Women in Science*.

■ **Encourage women to join professional organizations** for women in their field. Some law schools have women's legal caucuses where students and faculty can get to know one another informally as well as work on legal issues of concern to women. The Society of Women Engineers has chapters on campuses across the country. They help students prepare resumes and get jobs. (See list of some organizations in the Resources section, p. 17.)

■ **Encourage the organization of support groups** comprised of women students majoring in the same field. Undergraduates and graduate students can learn from each others' experiences and overcome the isolation women in traditionally male fields often feel.

■ **Hold a summer orientation program for first-year women;** introduce them to current students in traditionally male fields. Sponsor activities during regular preregistration for students and their families.

Recognition

■ **Ensure that women award winners at all levels are recognized** for their achievements. Host a luncheon or reception to honor the winners of scholarships, awards, or prizes. Notify the office of public information, as well as students' local papers/media.

■ **Be sure to include women when considering students to be teaching and research assistants.** Review data annually on the number of women and men who hold different kinds of assistantships. Evaluate whether women predominate as teaching assistants and men as research assistants.

■ **Offer to write letters of recommendation for women students.**

■ **Provide women with informal as well as formal feedback on the quality of their work.** Women often get less feedback—positive or negative—about their work.

Involvement

■ **Sponsor science and technical fairs** where undergraduate students can meet and talk with faculty and staff from various departments. This may help women in departments with small numbers of women meet other women on campus with similar interests.

■ **Integrate the use of computers into the general undergraduate curriculum** so that students who do not major in math or business will still be able to use and learn about computers. Sweet Briar College has integrated academic usage of computers across the liberal arts curriculum to offer students a comprehensive background in computer technology. Some 100 "public" computers are available to students in all disciplines in addition to a new computer lab in the Mathematical Sciences Department.

■ **Include climate issues in student evaluations.** Questions might include the following: Does the teacher call on women students as often as on men? Treat men's and women's comments with the same degree of seriousness? Make disparaging comments or use sexist humor? Make a special effort to treat women and men equally, that is, by avoiding sexist language or using sex-balanced class examples?

■ **Develop a survey for men and women students at all levels to evaluate classroom, departmental, and institutional climate** and to determine if women find the climate less congenial than men do. Massachusetts Institute of Technology, Smith College, University of New Hampshire, Dartmouth College, and others have examined the climate for women.

■ **Encourage joint projects and research between women students and faculty** outside of the regular classroom and laboratory.

■ **Encourage women students to take an active part in recruiting activities,** such as visiting high schools, serving on panels, preparing written materials, hosting visiting students, and writing to prospective students.

■ **Offer women students the opportunity to tutor/mentor younger students.** Set up a program at local high schools to do this as well.

Support Services

■ Often talented women and minorities miss the opportunity for graduate study in a traditionally male field because they have not taken prerequisite undergraduate coursework. **Re-entry programs can be set up for students who did not major in traditionally male fields as undergraduates but who wish to pursue graduate study in these fields.** The Computer Science Division at the University of California-Berkeley offers a program that includes two or three semesters of undergraduate coursework in a core curriculum, free tuition, and faculty advising.

■ To aid "nontraditional" students, such as those with full-time jobs, irregular hours, or child care responsibilities, **offer services such as child care facilities, and flexible office hours for faculty and staff.** William Mitchell College of Law (MN) has on-site child care.

■ **Offer video sections of courses.** Video sections of intermediate and advanced physics courses at Wayne State University (MI) allow students to view lectures anytime, 24 hours a day.

■ **Distribute an informational flyer to students on classroom climate issues,** including suggested actions and resource persons to contact. The University of Michigan has done this.

■ **Fund a resource center in a central location to coordinate support services and resources** for women in traditionally male fields, such as academic and personal counseling, scholarships, career planning, seminars and conferences, courses, and newsletters for women in traditionally male fields. If a separate office is not feasible, perhaps space at the women's center, the library, the continuing education department, or a specific department is available.

■ **Ensure that all faculty and staff are aware of this center and of the services available to women in traditionally male fields.**

■ **Find ways to encourage out-of-class interaction between minority and majority students, disabled and able-bodied students.** For example, be sure that programs, committees, and activities include them. Periodically evaluate programs, committees, and activities to see if this is so.

■ **Ensure that complaint procedures can accommodate subtle differential treatment as well as overt discrimination.** Emphasize establishing a confidential procedure including designating a specific person to whom concerns can be aired and who can provide informal feedback and assistance to those whose behavior is unprofessional. The procedure should have both formal and informal components.

Financial Aid and Award Programs

■ **Encourage women and minorities to apply to scholarship, grants, and loan programs for which they are eligible.**

■ **Make an effort to seek out and post information on awards, grant, and loan programs** offered by the university or outside organizations for women and minority students. Encourage women to apply for such programs.

■ **Seek funding for scholarship and award programs** for women and minority students. One program sponsored by the National Chicano Council on Higher Education and funded by the Atlantic Richfield Foundation helps build the corps of Hispanic faculty in engineering. The program will provide stipends for tuition and scientific research for twenty-five Hispanic juniors, ten of whom will receive support through four years of graduate school.

■ **Collect and review data annually on financial aid** to evaluate whether women are receiving their fair share of resources compared to men.

■ **Sponsor scholarships and awards.** Mount Mary College (WI) sponsors a math contest every year for high school girls. The winner receives a scholarship to the college.

■ **Develop procedures to remind and encourage faculty and administrators to nominate women** for prizes and awards so that women are not inadvertently overlooked. See *Women Winners*, listed in the Resources section, for a variety of recommendations on how to do this.

■ **Bring together courses in traditionally male fields with women's studies programs** to offer students information on women's research and history in a particular field as well as information on equity issues, life planning, and so on. Purdue University's School of Engineering offers an elective course which focuses on role models such as dual career couples, recent graduates, and engineering majors who go on to law school. The course is for credit and attracts many first-year women engineering students. A women and science seminar offered at Hampshire College (MA) focuses on such questions as: What is the experience of women in science? How does science look at women? What are the limitations of this? If more women were in science, would its form and content be different? Life patterns, networks, friends, and creating a work style are also covered.

Curriculum Development

■ **Consider offering a course or seminar such as women in science for first-year students.** The course would give students a chance to get to know one another, faculty could speak of their own professional interests and career routes, and professionals from the field could describe their career choices and activities. In a women and science course offered at Hampshire College, students give a presentation on their own work. Reading assignments and discussions focus on such questions as: What is the experience of women in science? How does science look at women? What are the limitations of this? How can women do science? If more women did science would its form and content be different?

■ **Loosen curriculum structure** to allow potential majors (and nonmajors) the opportunity to "browse" and to enter math and science tracks somewhat later than during their first year.

■ In courses designed to teach students about gaining access to science literature and critiquing the information as scientists **ensure that research by and about women is included.** In a course offered at Hampshire College, "Teaching the Biology of Women by Using Primary Scientific Literature," the professor assigns a primary research paper in which the students examine the presence of sex bias and related inaccuracies, thus learning that all science is not "objective."

Career Development

■ **Develop seminars, conferences, and special events to help women students gain skills** they will need in the professional work force. For example, at the College of William and Mary, the School of Business Administration's Women in Business Program sponsors seminars on developing leadership skills, career advancement, and effective management, among others.

■ **Involve faculty and administrators** from your campus in programs such as these but be sure also to draw upon the expertise of women outside the campus, professional communities, and associations.

■ **Offer a course**, either credit or noncredit, designed to assist women in exploring careers in technology. "Women in Technology," offered at Saskatoon Region Community College (Canada) includes refresher skills, hands-on instruction, and career planning for fields such as engineering and computer science.

■ **Make available in a central location current materials on careers** for women in science, engineering, math, law, business, and technical fields. Compile a bibliography on such information. Include a list of any video materials available for workshops, pre-college programs, etc. The Center for Learning Technologies at SUNY–Albany publishes a list: *Video Role*

Models for Women Interested in Business; Sports; Politics; The Arts; Society.

Job Experience

■ **Ensure that disabled students have the same opportunities for internships and work experiences** which are often crucial to learning, finding employment, and being accepted to graduate school in traditionally male fields. SUNY–Albany has had much success with placing disabled students in internships at university offices. One innovative program, the External Education Program for the Homebound at Queensborough Community College (NY), stresses the value of home-based work as an alternative to on-site employment. Students in the program have worked at home on telemarketing, market survey design, computer programming, and accounting.

■ **Encourage women students to get involved in the basic hands-on work** that often captivates young men and encourages them into engineering and technical fields. The New Jersey Institute of Technology offers a program to teach first-year students woodworking and car repair. The program also includes talks by women engineers and an opportunity for students to meet engineering alumnae. Purdue University offers a similar course to give students confidence with mechanical and electrical equipment. Over one-third of the women engineering students take the course. Programs aimed at women are not illegal, although it is best if men who want to enroll are allowed to do so. Such a program might be described in this way: "This program is designed primarily for women who. . . . Men who believe they could benefit from the program are welcome to enroll."

■ **Build ties with local research centers and the business community.** Explore the possibility of joint programs to encourage women's interest in male-dominated fields, aid the outside community in recruiting women employees, and foster interaction between the school and the community. Case Western Reserve University (OH) and NASA's Lewis Research Center sponsor the Women in Engineering and Science Programs, which offer undergraduate and graduate participants firsthand experience, an opportunity to meet women practitioners, summer employment opportunities, seminars, graduate research fellowships, and potentially, permanent, full-time employment after graduation.

■ **Keep a list of summer jobs, part-time jobs, and internships** available for women students. Encourage researchers on campus and employers to list opportunities with the program. Establish alumnae/i networks for internships, career exploration, and jobs.

■ **Ensure that the cooperative education program is aware of opportunities for, and is active in placing, women in traditionally male fields.** Make sure the program's brochure and written materials include women in these fields.

Selected List of Resources

PUBLICATIONS

Abramson, Jill. *Where They Are Now: The Women of Harvard Law 1974.* 1986. Available for $17.95 from Doubleday, Direct Mail Order Division, 501 Franklin Ave., Garden City, NY 11530.

Association of American Colleges, Project on the Status and Education of Women (AAC/PSEW). The following publications are available from AAC/PSEW, 1818 R Street, NW, Washington, DC 20009. Prepayment is required.

- Bogart, Karen. *Toward Equity: An Action Manual for Women in Academe.* 1984, 260 pp. $17.00.
- Bogart, Karen, et al. *Institutional Self-Study Guide on Sex Equity for Postsecondary Institutions.* 1981, five booklets and user's guide, approximately 100 pp. $10.00.
- Ehrhart, Julie K. *Minority Women's Organizations and Programs.* 1984, 7 pp. Available as part of a packet on minority women for $3.00.
- Hall, Roberta M. and Bernice R. Sandler. *Academic Mentoring for Women Students and Faculty: A New Look At An Old Way To Get Ahead.* 1983, 16 pp. $2.00.
- Hall, Roberta M. with Bernice R. Sandler. *The Classroom Climate: A Chilly One For Women?* 1982, 22 pp. Available as part of a packet of materials on climate issues for $7.00.
- Hall, Roberta M. and Bernice R. Sandler. *Out of the Classroom: A Chilly Campus Climate for Women?* 1984, 20 pp. Available as part of a packet of materials on climate issues for $7.00.
- *Recruiting Women for Traditionally "Male" Careers.* 1977, 9 pp. Available as part of a packet on nontraditional careers for women for $2.00.

Barriers to Equality in Academia: Women in Computer Science at MIT. 1983, 44 pp. A limited number of copies are available free by writing to Marilyn Pierce, Dept. of Electrical Engineering and Computer Science, MIT, Cambridge, MA 02139.

Benokraitis, Nijole V., and Joe R. Feagin. *Modern Sexism.* 1986, 187 pp. Available for $14.95 from Prentice-Hall, Mail Order Sales, 200 Old Tappan Rd., Old Tappan, NJ 07675.

Berryman, Sue E. *Who Will Do Science?* 1983, 124 pp. Available free from the Rockefeller Foundation, 1133 Avenue of the Americas, New York, NY 10036.

Beyond Equals, To Encourage the Participation of Women in Mathematics. 149 pp. $10.00 from the Math/Science Resource Center, Mills College, Oakland, CA 94613.

Chaplaine, Elaine B., and Claire M. Newman. *Teacher Education and Mathematics (TEAM).* 1985, nine books and two tapes. Available for $54.25 from EDC/Women's Educational Equity Act Publishing Center, 55 Chapel St., Newton, MA 02160.

Chester, Ronald. *Unequal Access: Women Lawyers In a Changing America.* 1985, 160 pp. Available for $27.95 from Bergin and Garvey Publishers, 670 Amherst Rd., South Hadley, MA 01075.

Davis, Barbara Gross, and Sheila Humpreys. *Evaluating Interven-*

tion Programs, Applications for Women's Programs in Math and Science. 1985, 256 pp. Available for $15.95 (paper) from Teachers College Press, Teachers College, Columbia University, New York, NY 10027.

A Directory of Federal R and D Agencies' Programs to Attract Women, Minorities and the Physically Handicapped to Careers in Science and Engineering. 1985, 27 pp. Available free from the National Science Foundation, Publication 85-51, Washington, DC 20550.

Epstein, Cynthia Fuchs. *Women in Law.* 1983, 438 pp. Available for $10.95 (paper) from Doubleday, Direct Mail Order Division, 501 Franklin Ave., Garden City, NY 11530.

Fox, Lynn H. *The Problem of Women and Mathematics.* 1981, 40 pp. Available free from The Ford Foundation, 320 East 43d St., New York, NY 10017.

Humphreys, Sheila M., ed. *Women and Minorities in Science, Strategies for Increasing Participation,* AAAS Selected Symposium 66. 1982, 218 pp. Available for $22.00 from Westview Press, Inc., 5500 Central Ave., Boulder, CO 80301.

Kahle, Jane Butler, ed. *Women in Science: A Report From the Field.* 1985, 238 pp. Available for $24.00 (cloth) or $15.00 (paper) from Taylor and Francis, Inc., 242 Cherry St., Philadelphia, PA 19106.

Leach, Alicia E., and Michele Aldrich. *Associations and Committees Of or For Women in Science, Engineering, Mathematics and Medicine.* 1984, 35 pp. Available for $1.00 from the Office of Opportunities in Science, American Association for the Advancement of Science, 1333 H St., NW, 10th Floor, Washington, DC 20005.

Leavitt, Judith A. *Women in Management: An Annotated Bibliography and Sourcelist.* 1982, 216 pp. Available for $33.00 (cloth) from Oryx Press, 2214 North Central at Encanto, Phoenix, AZ 85004.

Lorber, Judith. *Women Physicians: Careers, Status, and Power.* 1984, 149 pp. Available for $25.00 (cloth) or $10.50 (paper) from Methuen Inc., 29 West 35th St., 10th Floor, New York, NY 10001.

National Academy of Sciences, National Research Council. The following publications are available from National Academy Press, 2101 Constitution Ave., NW, Washington, DC 20418.

Career Outcomes in a Matched Sample of Men and Women Ph.D.s: An Analytical Report. 1981, 116 pp. $10.00

Climbing the Academic Ladder: Doctoral Women Scientists in Academe. 1979, 172 pp. $16.00

Climbing the Ladder: An Update on the Status of Doctoral Women Scientists and Engineers. 1983, 112 pp. $8.95

Research issues in the Employment of Women: Proceedings of a Workshop. 1974, 140 pp. Available for $14.00 (xeroxing) from the Library, National Academy of Sciences, at the address above.

Women Scientists in Industry and Government: How Much Progress in the 1970's? 1980, 56 pp. $5.50.

Ramaley, Judith, ed. *Covert Discrimination and Women in the Sciences.* 1978, 124 pp. AAAS Selected Symposium 14. Westview Press, Boulder, CO. Out of print.

Sargent, Alice G. *The Androgynous Manager.* 1983, 226 pp. $8.95 from American Management Association, Publication Services, 135 W. 50th St., New York, NY 10020.

Sloat, Barbara F., and Catherine M. DeLoughry. *Summer Internships in the Sciences for High School Women, A Model Program at the University of Michigan.* 1985, 32 pp. Single copies are available free from the Women in Science Program, University of Michigan, 350 S. Thayer St., Ann Arbor, MI 48109.

Special Report: The Corporate Woman. 1986, 32 pp. Available for $2.00 from the *Wall Street Journal,* Dow Jones and Co., Inc., Special Publications Department, 200 Burnett Rd., Chicopee, MA 01021.

Tobias, Sheila. *Succeed With Math: Every Student's Guide to Conquering Math Anxiety.* In Press. For further information, contact Editorial Office, The College Board, 45 Columbus Ave., New York, NY 10023.

Waite, Linda J., and Sue E. Berryman. *Women in Nontraditional Occupations, Choice and Turnover.* 1985, 85 pp. Available from The Rand Corporation, 1700 Main St., P.O. Box 2138, Santa Monica, CA 90406.

The Woman Engineer, quarterly. Available for $17.00 per year from Equal Opportunity Publications, Inc., 44 Broadway, Greenlawn, NY 11740.

Women in Engineering: Directory of College/University Programs. 1982, 20 pp. Available for $1.00 from the American Society for Engineering Education, 11 Dupont Circle, NW, Suite 200, Washington, DC 20036.

Zappert, Laraine T., and Kendyll Stansbury. "In the Pipeline: A Comparative Analysis of Men and Women in Graduate Programs in Science, Engineering and Medicine at Stanford University." 1984, 2 pp. Single copies are available free from News and Publications Service, Stanford University, Press Courtyard, Santa Teresa St., Stanford, CA 94305.

Zimmerman, Mary H., ed. *75-Year History of National Association of Women Lawyers* (1899–1974). 1975. Available for $12.50 from National Association of Women Lawyers, 750 North Lake Shore Dr., Chicago, IL 60611. Make checks payable to NAWL.

ORGANIZATIONS

American Association for the Advancement of Science
Office of Opportunities in Science
1333 H St., NW, 10th Floor
Washington, DC 20005
202/326-6680
Contact: Shirley Malcom, Director; Marsha Lakes Matyas, Director, Project on Women in Science; Yolanda George, Coordinator, National Network of Minority Women in Science; Virginia Stern, Director, Project on Science, Technology and Disability

American Association of Women Dentists
211 East Chicago Ave., Suite 948
Chicago, IL 60611
312/337-1563
Contact: Peter C. Goulding, Executive Director; or Cheryl Kraus, Executive Secretary

American Economic Association
1313 21st Ave., S., Suite 809
Nashville, TN 37212
615/322-2595
Contact: Alice Rivlin, President; Isabelle Sawhill, Chair, Committee on the Status of Women in the Economics Profession, 202/857-8531

American Medical Women's Association
465 Grand St.
New York, NY 10002
212/533-5104
Contact: Carol Davis-Grossman

American Society of Women Accountants
35 East Wacker Dr., Suite 1036
Chicago, IL 60601
312/726-9030
Contact: Miriam Green

Association for Women in Computing
1133 15th St., NW, Suite 1000
Washington, DC 20005
202/429-9440
Contact: Phyllis Call; President: Carol Grosvenor, 213/239-5706

Association for Women in Mathematics
Box 178
Wellesley College
Wellesley, MA 02181
617/235-0320 x2643
Contact: Margaret Munroe, Admin. Asst.

Association for Women in Science
2401 Virginia Ave., NW, Suite 303
Washington, DC 20037
Contact: Sheila Pfafflin, 212/605-7619

Association of American Law Schools
1 Dupont Circle, NW, Suite 370
Washington, DC 20036
202/296-8851
Contact: Marina Angel, Chair of AALS Section on Women in Legal Education 215/787-7861

Business and Professional Women's Foundation
2012 Massachusetts Ave., NW
Washington, DC 20036
202/293-1200
Contact: Alice Gerlach, Director

Caucus for Women in Statistics
P.O. Box 33916
Washington, DC 20033
Contact: Sandra McKenzie, 1987 President, 303/770-2917

Commission on Professionals in Science and Technology
1500 Massachusetts Ave., NW, Suite 831
Washington, DC 20005
202/223-6995
Contact: Betty Vetter or Eleanor Babco

Iota Sigma Pi
National Chemical Honor Society for Women
Contact: Celia J. Menendez-Botet, Dept. of Biochemistry, Memorial Sloan Kettering Cancer Center, 1275 York Ave., New York, NY 10021

Math/Science Network
Mills College
Oakland, CA 94613
415/430-2230
Contact: Nadina Cole

National Association for Female Executives
1041 Third Ave.
New York, NY 10021
212/371-0740

National Association of Bank Women
500 North Michigan Ave., Suite 1400
Chicago, IL 60611
312/661-1700
Contact: Kay Landen, President

National Association of Women Business Owners
600 S. Federal St., Suite 600
Chicago, IL 60605
312/346-2330

National Association of Women Lawyers
750 N. Lake Shore Dr.
Chicago, IL 60611
312/988-6186
Contact: Patricia O'Mahoney, Executive Director

The Society of Women Engineers
345 East 47th St.
New York, NY 10017
212/705-7855
Contact: B. J. Harrod, Acting Executive Director; B. K. Krenzer, President

The Society of Women Geographers
1619 New Hampshire Ave., NW
Washington, DC 20009
202/265-2669
Contact: Ellen Schou, Executive Secretary; Mary Vance Trent, International President

Women in Computing Interest Group
EDUCOM
Contact: Mary Grace Smith, 617/495-9021; Jean Dexheimer, 412/578-7643

Notes

1. Women are 96.9 percent of domestic workers, 95.6 percent of nurses, 80.7 percent of clerical workers and 70 percent of retail sales clerks. Bureau of the Census, *Statistical Abstract of the United States: 1984*, Washington, DC: GPO, 1984, pp. 419–420.

2. *Ibid.* Although the 50 million working women in the U.S. represented 44 percent of the total labor force in 1984, they accounted for 5.7 percent of engineers, 15.4 percent of lawyers and judges, 14.6 percent of physicians and dentists, 28 percent of managers and administrators, and 7 percent of craft workers.

3. In 1984, 60 percent of all women aged 20 to 65 were employed. *Women's Bureau, Meeting the Challenge of the 80's*, 1985, p. 1.

4. Sheila Pfafflin, "Women, Science and Technology," *American Psychologist*, Oct. 1984, p. 1184.

5. See, for example, Betty M. Vetter and Eleanor L. Babco, *Professional Women and Minorities A Manpower Data Resource Service*, Sixth Edition, Washington, DC: Commission on Professionals in Science and Technology, 1986; and Sue E. Berryman, *Who Will Do Science?* New York: The Rockefeller Foundation, 1983.

6. Berryman, p. 39.

7. *Ibid.*, p. 4.

8. It is expected to drop from a peak of 30 million in 1982 to about 24 million in 1995, according to the Office of Technology Assessment, *Demographic Trends and the Scientific and Engineering Work Force: A Technical Memorandum*, Dec., 1985, U.S. Government Printing Office.

9. Roberta M. Hall with Bernice R. Sandler, *The Classroom Climate: A Chilly One for Women?* 1982, and Hall and Sandler, *Out of the Classroom: A Chilly Campus Climate for Women?* 1984, Project on the Status and Education of Women (PSEW), Association of American Colleges. In addition, some information on the experience of graduate students comes from another PSEW report, Bernice R. Sandler with Roberta M. Hall, *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students*, 1986.

10. J. Parsons, *Self-Perceptions, Task Perceptions and Academic Choice: Origins and Change*, report to National Institute of Education (Michigan: NIE, 1980). Cited in Linda H. Lewis, "New Technologies, Old Patterns: Changing the Paradigm," *Educational Horizons*, Vol. 63, No. 3, Spring 1985, p. 130.

11. For further discussion, see K. P. Scott and C. G. Schau, "Sex Equity and Sex Bias in Instructional Materials," in Susan Klein, ed., *Handbook for Achieving Sex Equity Through Education*, Baltimore: The Johns Hopkins University Press, 1985.

12. At age nine, girls scored higher than boys on a test to measure mathematics achievement, according to 1982 data from the National Assessment of Educational Progress (NAEP). By 13, scores for females and males were virtually identical; yet by 17, the scores for males are higher than for females; data reported in *Concerns*, Issue XVI, October 1985, p. 1.

13. Results from an earlier NAEP study of science achievement and attitudes showed that girls compared with boys of the same age held less positive attitudes toward science and had participated in far fewer science activities. Other questions in the study concerning interest in observing scientific phenomena, using scientific equipment, and working with experimental materials showed that at age nine girls as well as boys wished to have these opportunities. Responses from 13 and 17 year-olds indicated, however, that girls' desires to participate in science activities diminished between ages nine and 13 as did achievement and actual science-related experiences. J. B. Kahle and M. K. Lakes, "The Myth of Equality in Science Classrooms," *Journal of Research in Science Teaching*, Vol. 20, 1983, pp. 131–140.

14. J.B. Kahle, "The Disadvantaged Majority: Science Education for Women," Outstanding paper, American Educators of Teachers of Science, 1983. Cited in Teresa Jump, Camilla Heid, John Harris III, *Feminist Teacher*, Spring 1985, p. 19.

15. *Women and Minorities in Science and Engineering*, Washington, DC: National Science Foundation, 1986, pp. 21–24.

16. Sue Berryman and Linda Waite, "Women in Nontraditional Occupations," Santa Monica, CA: Rand Corporation, 1984.

17. Jean Pedersen, speech at the International Congress of Mathematicians, Berkeley, CA, August 1986, quoted in *Hersay*, August, 1, 1986, p. 6.

18. Smithers and Collins in Kelly, A., *The Missing Half*, England: Manchester University Press, 1981.

19. Project on Equal Education Rights (PEER) Computer Equity Report, "Sex Bias at the Computer Terminal—How Schools Program Girls," Washington, DC, 1984.

20. Study by the Educational Testing Service, reported in Phyllis Rossen, "Do Schools Teach Computer Anxiety," Ms. Magazine, December, 1982, p. 15.

21. Carol B. Shmurak, "Rethinking Approaches to Science and Technology: Changing Girls' Ideas About Scientists' Work," *Education Week*, Vol. 5, No. 33, May 7, 1986.

22. Jane Butler Kahle, "Retention of Girls in Science: Case Studies of Secondary Teachers," in J. B. Kahle, ed., *Women in Science*, Philadelphia, PA; Taylor and Francis, Inc., 1985. Note: 86 percent of teachers in this case study were women; nationally, women compose 24 percent of all science teachers.

23. Correspondence with Sheila Tobias, October 3, 1986.

24. *Ibid.*

25. Norma C. Ware, Nicole A. Steckler, and Jane Leserman, "Undergraduate Women, Who Chooses a Science Major?" *Journal of Higher Education*, Vol. 56, No. 1, 1985, p. 76.

26. *Ibid.*

27. Norma C. Ware and Valerie Lee, "Predictor of Science Major Choice in a National Sample of Male and Female College Students," Radcliffe College, Cambridge, MA, 1985.

28. Lois Greenfield, Elizabeth Holloway, and Linda Remus,

"Women Students in Engineering: Are They So Different From Men?," *Journal of College Student Personnel*, Vol. 23, No. 6, Nov. 1982.

29. A surgical resident attending a conference, "Women in Medicine: Challenges of the Future," Hunter College, April 1986.

30. Ware, Steckler, and Leserman, p. 75.

31. National Science Foundation, 1986. (These figures include degrees granted in physical science, engineering, mathematical science [including computer science], and life science.)

32. Evelyn Fox Keller, *Sojourner*, March 1985, p. 18.

33. Response to PSEW "Call for Information," February, 1986.

34. M. Elizabeth Tidball, "Baccalaureate Origins of Entrants into American Medical Schools," *Journal of Higher Education*, Vol. 56, No. 4, July/August 1985, p. 396.

35. See Ruth Hubbard, "Should Professional Women Be Like Men?" in Violet B. Haas and Carolyn C. Perrucci, eds., *Women in Scientific and Engineering Professions*, Ann Arbor: University of Michigan Press, 1984.

36. Sheila Tobias, "Peer Perspectives on the Teaching of Science," *Change*, Vol. 18, No. 2, March/April 1986, pp. 36–41.

37. Vera Rubin, "Women's Work," *Science 86*, July/August 1986, p. 65.

38. Response to PSEW "Call for Information," graduate student in economics, October 1986.

39. For further discussion of issues surrounding sexual harassment on campus, see packet of papers on sexual harassment published by the Project on the Status and Education of Women, Association of American Colleges, Washington, DC; and Billie Wright Dzeich and Linda Weiner, *The Lecherous Professor, Sexual Harassment on Campus*, Boston: Beacon Press, 1984.

40. This term was used in *Modern Sexism*, by Nijole V. Benokraitis and Joe R. Feagin, Old Tappan, NJ: Prentice Hall, 1986.

41. See note 9.

42. The term "micro-inequities" was coined by Mary Rowe in "The Saturn Rings Phenomenon: Micro-Inequities and Unequal Opportunity in the American Economy," in Patricia Bourne and Velma Parness, eds., *Proceedings of the National Science Foundation Conference on Women's Leadership and Authority*, University of California, Santa Cruz, CA, 1977.

43. Loraine Zappert and Kendyll Stansbury, "In the Pipeline, A Comparative Analysis of Men and Women in Graduate Programs in Science, Engineering and Medicine at Stanford University," Stanford University, 1984.

44. Norma Ware and Nicole Steckler, "Choosing a Science Major: The Experience of Women and Men," *Women's Studies Quarterly*, Summer 1983.

45. Judith Stitzel and Virginia Wheeless, "What Women in Science and Engineering Tell Us About Women's Studies," *Women's Studies Quarterly*, Fall 1983.

46. Co-authors are more likely to be of the same sex so that women in a predominantly male field may have difficulty finding a collaborator. See, for example, M. A. Ferber and M. Teiman, "Are Women Economists at a Disadvantage in Publishing Journal Articles?" *Eastern Economic Journal*, Vol. 6, No. 324, August–October 1980, pp. 189–194.

47. M. Elizabeth Tidball, "Baccalaureate Origins of Entrants into American Medical Schools," *Journal of Higher Education*, Vol. 56, No. 4, July/August 1985.

48. M. Elizabeth Tidball, "Women's Colleges and Women Achievers Revisited," *Signs*, Vol. 5, Spring 1980, pp. 504–515.

49. M. Elizabeth Tidball, "Baccalaureate Origins of Recent Natural Science Doctorates," *Journal of Higher Education*, November/December 1986, Vol. 57, No. 6, pp. 606–620.

50. Female student in engineering and physical science, in Zappert and Stansbury, p. 18.

51. Mildred Dalton Henry, "Black Reentry Females: Their Concerns and Needs," *Journal of the National Association for Women Deans, Administrators, and Counselors*, Vol. 48, No. 4, Summer 1985, p. 8.

52. Told to Bernice R. Sandler by graduate student, February 1986.

53. Chalsa M. Loo and Garry Rolison, "Alienation of Ethnic Minority Students at a Predominantly White University," *Journal of Higher Education*, Vol. 57, No. 1, January/February 1986, p. 67.

54. *Ibid.*, p. 65

55. J. Herman Blake, "Approaching Minority Students as Assets," *Academe*, Vol. 71, No. 6, November/December 1985, p. 20.

56. For further discussion of barriers to older women's participation and retention strategies, see, for example, Mary Ann Brenden, "Retention of Undergraduate Women of Nontraditional Age: Patterns, Strategies, and Services," *Journal of the National Association for Women Deans, Administrators, and Counselors*, Vol. 48, No. 3, Spring 1985, pp. 22–27.

57. Carol C. Halpern and Marlene Samuelson, "Our Progress and Struggles as Feminists Teaching Biology," *Feminist Teacher*, Vol. 1, No. 4, 1985, p. 34. When presented with this exercise/riddle, four students out of nine in an all-women Cell Biology class figured out the answer. In an all-women General Biology class, the numbers were five out of fifteen. When presented at the end of the semester in a co-ed Sex and Gender class, only three out of seventeen students came up with the solution.

58. Mary Williams Clark, *Swarthmore College Bulletin*, November 1985.

59. Philip Goldberg, "Are Women Prejudiced Against Women?" *Trans-Action*, Vol. 5, 1968, pp. 28–30. Several more recent studies have confirmed Goldberg's findings. Among them are Michele A. Paludi and Lisa A. Strayer, "What's in an Author's Name? Differential Evaluations of Performance as a Function of Author's Name," *Sex Roles*, Vol. 12, Nos. 3/4,

1985, pp. 353-361; and Michele A. Paludi and William D. Bauer, "Goldberg Revisited; What's in an Author's Name?" *Sex Roles*, Vol. 9, No. 3, 1983, pp 387-390. See also L. S. Fidell, "Empirical Verification of Sex Discrimination in Hiring Practices in Psychology," in R. K. Unger and F. L. Denmark, eds., *Woman: Dependent or Independent Variable*, Psychological Dimensions, NY, 1975 as cited in F. L. Geis, M. R. Carter and D. J. Butler, *Research on Seeing and Evaluating People*, Office of Women's Affairs, University of Delaware, Newark, DE, 1982, p. 22.

60. MIT Computer Science Female Graduate Students and Research Staff "Barriers to Equality in Academia: Women in Computer Science at MIT," February 1983, p. 7.

61. *Teaching By the Case Method*, C. Roland Christensen, 1978, out of print. Revised edition in press.

62. See, for example, El-Khawas, E. H., "Sex Differences in Academic Development," *Men and Women Learning Together: College Students in the Late 70's*, Report of the Brown Project, Office of the Provost, Brown University, 1980; Zappert and Stansbury, p. 18; and Jayne Stake and Suzanna Rose, "The Development of Career Confidence: Making the Difference for College Women," *Feminist Teacher*, Vol. 1, No. 4, 1985.

63. Ware and Steckler, 1983, p. 14.

64. MIT, p. 14.

65. *Ibid.*

66. *Ibid.*

67. *Ibid.*, p. 15.

68. Student comment in discussion of classroom climate issues, as cited in Hall and Sandler, 1984.

69. MIT, p. 8.

70. *Ibid.*, p. 19.

71. *Ibid.*, p. 18.

72. A 34-year-old medical student attending the conference listed in note 29.

73. Female fourth-year Yale medical student at conference above.

74. Lynn Hecht Schafran, "How Stereotypes About Women Influence Judges," *Judges Journal*, American Bar Association, Winter 1985, Vol. 24, No. 1, p. 15.

75. A surgical resident at conference referred to in note 29.

76. Zappert and Stansbury, p. 20.

77. C. J. Auster, "Nontraditional Occupational Choice: A Comparative Study of Women and Men in Engineering," Unpublished Ph.D. dissertation, Princeton University, 1984, p. 205.

Institutional Self-evaluation Checklist

The following questionnaire highlights some of the areas institutions will want to evaluate in order to improve the recruitment and retention of women students in programs such as business, computer science, law, mathematics, and science. Additionally, many of the recommendations listed in this paper might be used for self-evaluation.

I. Institutional Data

- Is information on the number and percentage of women and men students in each major and at each degree level collected, disseminated, and reviewed on a regular basis? Are data collected by sex, race, and ethnicity—for example, American Indian women, Asian American women, Black women, Caucasian women, Hispanic women?
- Are application and attrition rates for students (including graduate and professional students) in traditionally male fields studied by sex, race, and ethnicity? Are data reviewed for specific programs and departments? If rates vary, how does the institution respond?
- What is the number and percentage of women and men faculty by rank in each department and division? Are other factors such as promotion and tenure rates, salaries, teaching loads, number of advisees, committee loads, and released time for conferences compared for women and men at each rank? Are special efforts needed to respond to excessive differences between women and men?

II. Structural Issues

- Is the status of women, including the climate for women on campus, reviewed regularly? Is there a commission on women or other official body to identify issues and make recommendations? Is there a top level administrator whose responsibilities include overseeing women's equity initiatives?
- What other structures are already in place that could help support efforts to build a good climate for women (including minority women, older women, and disabled women)? Examples: women's commission, women's studies program, women's center, research institute on women, Title IX officer, affirmative action office; ombudsperson, representatives from the president's, vice-president's, and/or provost's offices; counselors, women's athletic programs; women student groups, women's professional caucuses. Are these groups and offices given adequate institutional support (funding and facilities)? How do students learn about these resources—are they adequately publicized?
- Are all official publications, such as recruitment materials, the catalogue, yearbook, newspaper, and so forth, regularly evaluated to see that women are fairly represented, and not portrayed in stereotypical or otherwise negative ways? Are there guidelines to ensure this?
- Is there a mechanism, either within individual departments or campus-wide, for airing concerns and providing feedback to faculty and staff about overtly biased comments, sexist behavior, and other climate issues?
- Are there policies concerning issues such as sexual harassment and sexist language?

III. Programs

- Is there support at all levels of the administration for the development of special programs to recruit, retain, and improve women's opportunities in traditionally male fields? What are some recent examples of such support?
- Are in-service programs offered to help faculty and staff become more aware of and change behaviors that might inhibit women's self-confidence and limit their opportunities?
- Are student services staff, faculty, teaching and research assistants, and others provided with appropriate guidelines and/or training for avoiding sexual harassment as well as other forms of sex bias in interactions with students?

IV. Curriculum Issues

- Is the institution engaged in efforts to integrate scholarship by and about women into *all* fields? If not, what are the effective structures to encourage the process?
- Are textbooks evaluated for sex bias?

V. Student Issues

- How does the institution address a lack of women students in specific departments and divisions? Is there a well-implemented, comprehensive plan?
- Are there special efforts made (such as in recruiting, financial aid, part-time studies, and other programs) to accommodate older women and disabled women students? Is campus child care available?
- Do programs aimed at minority students make special efforts to reach and serve minority women?

VI. Faculty Issues

- How does the institution address a lack of women faculty in specific departments and divisions?
- Are efforts made to provide female role models other than faculty in traditionally male fields (e.g. guest lecturers, professionals from outside academe, etc.)?

Acknowledgments

This report was supported by the Department of Education, under the auspices of the Women's Educational Equity Act, Grant #G008510365. However, the opinions expressed herein do not necessarily reflect the position or policy of the Department of Education, and no official endorsement by the department should be inferred.

The development of the report was guided by an Advisory Committee comprised of Carol Adams, Director, Department of Afro-American Studies, Loyola University; Jean Lightfoot, Director, Educational Assistance Programs, University of Illinois at Chicago; Marsha Matyas, Project Director, Women in Science, Office of Opportunities in Science, American Association for the Advancement of Science; Marilynne Roberts, Associate Professor, Hamline University School of Law; and M. Elizabeth Tidball, Professor, Department of Physiology, George Washington University Medical Center.

The following persons also reviewed the draft and made many helpful suggestions: Ruth Beier, Roberta M. Hall, Barbara Rollinson, Linda Taylor, Sheila Tobias, Betty Vetter, Viola Young-Horvath, and Donna Zubris. Special thanks also go to PSEW Research Associate Jean O. Hughes.

INFORMATION ON STUDENT CLIMATE ISSUES AVAILABLE

The Classroom Climate: A Chilly One for Women? Examines ways in which male and female students are treated differently in the classroom by faculty—both men and women. Includes over 100 recommendations for change. 1982, 24 pp., $3.00 (prepaid).

Selected Activities Using "The Classroom Climate: A Chilly One for Women?" 1984, 4 pp., $1.00 (prepaid).

Out of the Classroom: A Chilly Campus Climate for Women? Examines how various aspects of the campus climate chill the learning experiences of women students. Includes 80 recommendations for change. 1984, 20 pp., $3.00 (prepaid).

These publications can be ordered from the Project on the Status and Education of Women, Association of American Colleges, 1818 R Street, NW, Washington, DC 20009. Please make checks payable to AAC/PSEW. A list of other PSEW publications can be obtained by sending a self-addressed, stamped envelope.

AAC
ASSOCIATION of AMERICAN COLLEGES
1818 R Street, N.W.
Washington, D.C.
20009